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Report

on a

Visit to Yugoslavia from 30 June to 8 August 1952

by

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List of Recommendations

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INTRODUCTION

This visit was made at the request of the Yugoslav Government, from 30 June to 8 August 1952, for the following purposes:

1. Consultation on some specific water and sewage problems and for providing technical information on those subjects
2. Discussion of the overall environmental sanitation programme in Yugoslavia
3. Discussion of the training of environmental sanitation personnel.

The itinerary for this visit is given in Appendix 1.

No attempt is made in this report to give either general information on Yugoslavia or to discuss the health organization of the country. These data are available in the reports of other consultants who have previously visited the country. This is a report of impressions gained during visits to all of the six People's Republics. At the request of the Deputy Minister of Public Health, it is directed principally towards the defects and deficiencies of the environmental sanitation programme. As such it represents an extension of remarks made at a meeting convened by the Minister of Public Health and Social Welfare in Belgrade on 31 July 1952. A list of those attending that meeting is given in Appendix 2.

No mention is made in the report of the requests for specific information which were received while travelling through Yugoslavia. In all such cases steps have been taken in co-operation with the Regional Office for Europe of WHO to obtain and transmit the information.

It should be emphasized that all the views expressed in this report are my own, and do not necessarily have the concurrence of either WHO or of the persons with whom I conferred in Yugoslavia.

Throughout this report the term "Environmental Sanitation" will be used in the broad sense of that of the WHO Expert Committee on Environmental Sanitation in its Second Report (WHO Tech. Report Series No. 47 1952) which is quoted below:

"1.1.2 By the term "environmental sanitation" the committee means the control of all those factors in man's physical environment which exercise or may

exercise a deleterious effect on his physical, mental or social wellbeing In particular it refers to the control of:

(a) methods for the disposal of excreta, sewage, and community wastes to ensure that they are adequate and safe;

(b) water-supplies, to ensure that they are pure and wholesome;

(c) housing, to ensure that is of a character likely to

(i) provide as few opportunities as possible for the direct transmission of disease, especially respiratory infections, and

(ii) encourage healthful habits in the occupants;

(d) milk and other food-supplies, to ensure that they are safe (the question of their nutritive quality being excluded from consideration);

(e) personal and public habits of cleanliness, especially in relation to disease;

(f) arthropod, rodent, mollusc, or other alternative hosts associated with human disease;

(g) atmospheric conditions, to ensure that the external atmosphere is free from deleterious elements and that the internal conditions of workshops, houses, etc., are suitable for the occupations undertaken in them;

(h) factories, workshops, dwellings, streets, and the general environment, to ensure freedom from risk to health whether mechanical, chemical, or biological, and to provide the best working and living conditions."

In the disussion on personnel necessary for carrying on environmental sanitation programmes, I am not unmindful of the great need for physicians. However, I do not consider myself competent to discuss medical personnel. I do agree completely with that eminent physician, Professor George MacDonald who said (see Bulletin No. 3, The London School of Hygiene and Tropical Medicine, January 1950):

"Medicine and engineering are as closely connected as any sciences and without a realization of that throughout the world we shall not escape from the pit into which we have latterly sunk."

SANITATION PERSONNEL

Three types of sanitation personnel are used in Yugoslavia - professional sanitary engineers, sanitary technicians and "disinfectors". The training and utilization of these personnel is discussed below.

Sanitary Engineers

Only three of the People's Republics (Croatia, Serbia and Slovenia) have sanitary engineers in their governmental health organizations. In the case of Serbia and Croatia, the sanitary engineering personnel seem to be quite well utilized both for the planning and construction of sanitary works. In both of these Republics one might comment that the maximum use is not made of sanitary engineering skills in the operation of works. In the other Republics failure to have proper sanitary engineering advice has resulted in some unfortunate errors. For instance, at Saraj a swimming pool was constructed without previous consultation with public health officials. Architecturally it is quite a beautiful structure, but it is not provided with water purification equipment. Another example is the waterworks at Titograd where because of excessive pressure and possibly also because of structural weakness of the pipes, there is frequent breakage of the cement asbestos pipes. A different design would have saved pumping costs and might also have saved cost of replacement of pipes. Still another example is the entirely inadequate waterworks at Sarajevo where it is proposed to use a large amount of very critically needed cast-iron piping on a project which will not solve the water needs of the city. A small amount of additional piping and two pumps connected to a different source would give a much more nearly adequate solution.

Sanitary engineers are essential members of every health team. Such sanitary engineers should be well-trained in the public health implications of their work. They should serve on the preventive medicine team and should provide the special sanitary engineering skills essential to carrying out preventive medicine work.

Recommendation: The central health agency of each People's Republic should have on its staff at least one well-trained sanitary engineer who appreciates the public health implications of such work. This sanitary engineer should play a vital part both in the planning of works which have sanitary implications as well as in their operation after they are constructed. This is particularly essential at this time when it is proposed to increase materially the construction of sanitary works.

Training of Sanitary Engineers

At the Engineering School in the University of Zagreb, a selected group of civil engineering students take multiple courses in sanitary engineering, given by a faculty of high qualifications. In the Engineering School of the University of Belgrade, selected engineering students also receive some instruction in sanitary engineering through a single course offered by a highly competent professor. In both of these Universities the faculties apparently regard the work as an introduction to sanitary engineering and appreciate that insufficient training is given to produce a highly qualified sanitary engineer. The School of Public Health in Zagreb gives post-graduate instruction in sanitary engineering to engineers and architects. Both the faculty and the equipment at this School are excellent. The Institute of Hygiene at Belgrade has also this year offered a course in public health and sanitary engineering for engineers and architects. The University of Belgrade does not participate in giving this course.

In order to produce satisfactorily trained sanitary engineers for public health work, post-graduate instruction seems to be almost mandatory. The time necessary for teaching of fundamental engineering subjects in the undergraduate curriculum does not allow for sufficient time for specialized training such as is essential in sanitary engineering. In this connexion, reference is made to the Second Report of the WHO Expert Committee on Environmental Sanitation, an extract from which is quoted below (WHO Tech. Report Series No. 47 1952)

"3.1 Sanitary Engineers

The committee concurs with the general principle set forth in section 5.4 of the report on the first session of the Expert Committee on Professional and Technical Education of Medical and Auxiliary Personnel:

> "Public-health engineers should possess basic education and training in engineering followed by at least an academic year's specialized education and training. The latter should include the sciences of bacteriology, chemistry and human physiology as related to problems of public-health engineering interest. Also, the principles and practices of engineering analysis, design, and operation as applied to works of water-supply purification, sewerage and sewage treatment, the collection and disposal of municipal, rural and industrial wastes, insect and rodent control, the engineering and administrative phases of food and milk sanitation, the sanitation of buildings, including ventilation, air conditioning, heating, plumbing and illumination, housing, industrial sanitation with particular reference to those industrial hazards the correction of which is an engineering problem, should be considered .... The postgraduate training of the engineer should also include adequate instruction in public health, including public-health practice, epidemiology, health statistics, and health education of the public"

There are also great advantages in offering engineering training in schools where medical officers of health and other health workers are also being trained. The classes may or may not be shared, but the opportunity for the groups to mingle tends to produce mutual understanding and appreciation of the complementary functions of the various professions in public health. This will be a great asset and will pave the way for teamwork in public-health activity, which is essential for maximum success."

In general it is my opinion that sanitary engineering education at the post-graduate level is best carried on as a University function. Also it is essential that such instruction be carried on in an institution which has adequate facilities both from the standpoint of faculty and physical equipment. At the present time only the School of Public Health at Zagreb seems to have both adequate physical facilities and faculty.

Recommendation: It is not necessary and perhaps not even desirable that post-graduate instruction in sanitary engineering be carried on in each of the

People's Republics. It is far more desirable that the concentration be on quality rather than on quantity. It seems that at the most two schools - perhaps the School of Public Health at Zagreb and the University of Belgrade - could meet the demand for post-graduate instruction in sanitary engineering.

Utilization and Training of Sanitary Technicians

The utilization and training of sanitary technicians are discussed together since they are so closely related. Sanitary technicians are utilized both for inspectional field work and for laboratory work and this dual usage has a direct influence on the training which they are given. In this report only the work of the sanitarian engaged in field work is discussed.

Until just recently the general pattern of training has been first 8 years of general education, followed by 4 years of specialized training in public health and related fields. In the past two years most of the training institutes have asked that the persons enrolled in the sanitary technicians course have 10 years of total education after which a specialized training of 3 years duration is given. Many of the directors of training schools indicated that they were unable to get a sufficient number of enrollees since the educational requirement for entrance had been increased. As a result, a number of them favoured a return to the lower educational level. On the other hand, the director of one training institution stated that he hoped that the requirement would eventually be raised to 12 years of general education plus 3 years of specialized education. All seemed to agree that the newly trained sanitary technician lacked sufficient maturity to do a good job of field work. While my own observations were necessarily limited, I found practically no evidence of effective field work by these sanitary technicians.

In my opinion it is absolutely essential in any well-organized health service that there be well-qualified sanitary technicians who are able to carry on the routine investigational and educational work of the health agency. Such personnel do not replace highly trained professional people, such as physicians and sanitary engineers, in the health department, but they augment their work. Sanitary technicians must, if they are to do this effectively, be persons who will be

respected in the community both from the standpoint of training and from the standpoint of integrity. If sanitary technicians are selected from a group which has had higher general education and if they themselves earnestly wish to enter the public health field, the possibility of their success will be much improved. One country which has made very effective use of sanitary technicians is the United Kingdom (where they are known as "sanitary inspectors"). It is believed that a study of the system of the training and utilization of "sanitary inspectors" in the United Kingdom by a competent person from Yugoslavia might suggest certain modifications of the system now in use in Yugoslavia. Such a study would best be carried on by a visit of several months duration to the United Kingdom.

In connexion with the utilization and training of sanitation personnel, the following pertinent quotations from the WHO Expert Committee on Environmental Sanitation Second Report (WHO Tech. Report Series No. 47 1952) are given:

"2.8 Sanitarians

The personnel included within the category of sanitarians have, for purposes of convenience and simplicity, been grouped into three classes, under the titles "health inspector", "health assistant", and "health aid". These titles do not necessarily correspond to personnel in any one country having the same or similar titles. In general, these titles do not include medical personnel (discussed in sections 2.4 and 2.5, page 10).

2.8.1 Health inspector. This grade has been described as the backbone of the sanitation service. Certainly this officer has a very important part to play in the wide field of environmental sanitation. His educational background should be the equivalent of some 12 years of education from the beginning, and should be sufficient to permit him to matriculate at a university, for his duties involve inspections, dealing with complaints, contact with the public, and the promotion of programmes of sanitary importance. For these important duties, and particularly in view of his close contact with the public, he has to be chosen not only for his ability, but for his personality and his integrity.

In many countries the health inspector is a well-established public officer whose contributions to the sanitary improvement of these countries have been invaluable and have been spread over a century of effort. It is felt in many quarters that some prospect of advancement should be offered to this highly trained type of person. Consideration may have to be given to the creation of higher posts in this group for the most capable who may graduate in sanitary science or hygiene at university level.

2.8.2 Health assistant. The health assistant is a lower grade of sanitarian who works under the direction of a senior person - in this case a health inspector. The educational standard required of him should be the equivalent of at least seven to eight years of education from the beginning, or in some countries equivalent to that of the highest class in the elementary school. This officer should have some knowledge also of the construction of wells, latrines, and privies and of how to assist in insect and rodent control.

2.8.3 Health aid. This grade of sanitarian functions as an orderly or sanitary guard performing, under suitable direction, general sanitary duties in rural areas. Such a person should, of course, be given instruction adapted to the job he has to do. His requirements in this direction are elementary and can be met by a rudimentary knowledge of the housing and sanitary conditions of the people he serves. The standard of education demanded is also elementary, comprising reasonable competence in reading, writing and simple arithmetic."

"3.7 Sanitarians

3.7.1 Health inspector. A large part of the training of the health inspector should consist of practical demonstrations with a period of experience in a health department. The course should be so designed that the subjects may be expanded to higher stages to enable the health inspector, with further study, to advance, if he is suitable and so desires, to the academic course. He should be imbued with a spirit of inquiry and enthusiasm

for public-health ideals. The basic idea is to educate and train a good general practitioner of environmental sanitation. The course of study should include the elements of the following subjects: mathematics, physics, chemistry, bacteriology, parasitology, epidemiology, anatomy and physiology; the control of communicable diseases; disinfection and disinfestation; water-supply and treatment; sewerage and sewage treatment; the collection and disposal of refuse and excreta; insect and rodent control; factory inspection; building construction, including drainage, septic tanks, soakage pits, and the like; and the drawing and examination of simple plans. The health inspector should be instructed in the inspection of meat and food-stuffs and the procuring of samples for analysis, and be able to deal with special sanitary problems in places such as hospitals, schools, airports, mines, etc. He should also receive instruction in public health administration, statistics, legislation and legal procedure.

3.7.2 Health assistant. The education and training of the health assistant should be designed so that he may play an important part in environmental sanitation in urban and rural areas under suitable direction. The course of study should provide ample time for practical demonstrations. The subjects taught should include: very elementary anatomy and physiology; mensuration, simple geometry, simple arithmetic, and sketching; general hygiene, causes of disease, and sanitation, including air, water, and food. The course should provide some instruction in communicable diseases, disinfection and disinfestation, case investigation and control methods, elementary medical entomology and elementary helminthology, collection and disposal of refuse and night soil, with some information on the more complex sewerage, sewage disposal, and water-supply systems. The health assistant should also be instructed in food inspection, with visits to food production establishments; in nutrition; in rodent and insect control; in the use of artisan's tools and the construction of latrines and privies; and in personal hygiene. He should be encouraged to promote health education in rural communities.

3.7.3 Health aid. Under suitable direction the health aid would be a valuable person in the promotion of rural sanitation. His instruction, therefore, should include a knowledge of sanitary work as applied to rural areas, such as the raising of the standard of housing, the improvement of rural water-supplies, and refuse and excreta collection and disposal. The course should include elementary understanding of the factors concerned in the spread of the common communicable diseases in relation to sanitation. The health aid should be able to recognize local insect pests and rodents and be instructed in disinfection and disinfestation. The course should include the preparation of simple hygiene reports and the keeping of a diary. He should be able to construct simple sanitary works."

Recommendation:

(a) The possibility of increasing the educational standard for entrance into the training course for sanitary technicians should be studied. In no case should the present educational standard be lowered.

(b) A study of the British system of training and utilizing "sanitary inspectors" should be made to determine if any parts of that system are adaptable to Yugoslavia. Such a study should be made by competent persons, preferably by a study tour in the United Kingdom. This seems to be a legitimate usage of WHO fellowships and I recommend that two persons, well experienced and having responsible positions in the Government be selected for such study tours.

Voluntary leaders for self-help

Use has been made in a number of instances of volunteer leaders for self help in villages as a device to raise sanitary standards. However, it does not appear that this system is being very widely expanded. Such programmes as the construction of small water supplies by volunteer labour are not only helpful in providing a sanitary facility, but should also be of great assistance as an "entering" wedge for other local health programmes. The following from the Second Report of the Expert Committee on Environmental Sanitation (WHO Tech.

Report Series No. 47, 1952) is quoted:

"2.9 Voluntary leaders for the mobilization of self-help

2.9.1 In underdeveloped areas of the world where public and personal health services are almost non-existent, an attempt should be made to mobilize the interest and resources of the local people in each village by voluntary self-help. Mere diagnosis of the faults in their environment and occasional advice do not necessarily produce results.

Local leaders should be sought who are interested in the welfare of the community as a whole, as their advice is readily acceptable. Village schoolmasters and young men with enthusiasm who work or own property in the village are particularly suitable people to lead self-help movements.

The success of self-help depends upon the initiative originating from the village in question, after it is made aware of the available technical facilities which the villagers can utilize to improve their health circumstances if they organize themselves. Much depends on the availability of some government official to educate, not only village leaders, but also the villagers themselves as to how their specific health conditions may be bettered provided they organize themselves to utilize the technical services at the regional and subcentral levels. It is much preferable for the approach to the village to be integrated with the activities of other welfare agencies such as agriculture, education, co-operatives, etc. In fact, it may be stated that a sanitation programme unco-ordinated with a programme for general economic and social improvement will have little chance of permanent success in an underdeveloped area.

2.9.2 In more-developed areas of the world a similar effort to mobilize voluntary self-help should be made. In these areas, while more assistance from health services and existing organizations can be expected, the need and importance of such a programme is equally great. Particular attention should be paid to the education of the public in the subject of sanitation; in this connexion the committee endorses the recommendations made in section 3.8 of the report on its first session."

"3.8 Voluntary leaders for mobilization of self-help

The people in this category cannot spare the time for long and formal education far away from their homes. Short but intensive training for about two weeks has been tried and found sufficient. The curriculum should be simple and practical. Besides explaining the causes and mode of communication of the most important diseases prevailing in the area, the curriculum should emphasize the need for personal hygiene, sanitation of the environment, and maternal and child care. It should also provide data on and point out sources of materials and skilled advice that may be available to the local people for improving the environment, and for constructing sanitary facilities such as wells for safe water-supplies, or sanitary latrines and privies. The trainee will have to be taught in the language of the locality. In the case of volunteers and village schoolmasters, the period of training should be so chosen as to interfere least with their normal business. After receiving training, the volunteers and trained teachers should be the chosen repositories of confidence of the local health authorities in those matters which come reasonably within their competence, for example, the issue of insecticides."

Recommendation: The programme of utilizing voluntary leaders for self-help should be greatly expanded.

SPECIFIC PROGRAMMES

Water Supplies

There is, of course, no resource more vital to a country's life and development than is its water supplies. At this period of development when every effort is being made to provide water supplies for all people, it is particularly necessary that there be more sanitary engineering planning in order to conserve critically scarce materials involved. For instance, the proposed Sarajevo project referred to previously appears to be a wasteful use of badly needed pipe.

One of the real health problems in Yugoslavia is in connexion with low and negative pressures on water mains. These occur in practically every major city because of water shortages and because of inadequate sizes of mains. These low and negative pressures have been the cause of several major outbreaks of water-borne diseases. For instance, in 1950 there was a major outbreak of dysentery in Sarajevo involving 200 civilians and an unknown number of military personnel from sewage which had entered a water main when the water was under vacuum. In 1951 in the same city there were 60 cases of gastro-enteritis in one neighbourhood which followed the shutting off of the water supply. In 1947 and 1950 negative pressures occasioned typhoid fever outbreaks in Ulcinj. This outbreak is described in an article entitled: "Water-borne epidemics of typhoid fever in Ulcinj in 1947 and 1950" (see pages 98-105 of Vojnosanitetski Pregled March-April 1952). A summary of this article is quoted:

> "The city of Ulcinj (4390 inhabitants) is supplied with water which is neither filtered nor chlorinated. The gravitational water supply system is damaged in many places and as there is often lack of water in the empty tubes, a negative pressure ensues which aspirates the sewage waters. The sewage drainage system is incorrectly built and in many places it crosses the water pipes. The potable water permanently shows evidence of fecal contamination, with more than 1000 b.coli in 1 litre. Cases of dysentery and typhoid fever are endemic in the city.
>
> Both epidemics described in this report appeared in November, immediately following massive rainfalls; they were caused by penetration of sewage in a damaged water pipe. Their duration was about 40 days and they were limited to the part of the city which was situated below the damaged water pipe.
>
> In the first epidemic 23 persons were involved, in the second 29. In the families exposed to the infection, generally only one member was affected, the whole morbidity being 23,59 p.c. Women were affected more often than men (28,39 p.c. vs 17,39 p.c.)
>
> The incubation period lasted 16 to 27 days; the course of the disease was mild and there were no deaths. By means of the Vi-Widal test and the cultures of feces and urine, 3 carriers were discovered; whereas in the sewage the bacteriophages of typhoid fever and dysentery were isolated. The epidemics stopped when the damaged water pipe had been found and repaired."

It is quite probable that there have been a number of other less specific outbreaks for the same reason. It certainly is true that water-borne diseases occur

in epidemic form. For instance, in 1942 there were 2050 cases and approximately 200 deaths from typhoid fever in Sarajevo during an epidemic caused by the city water supply.

Every effort must be made to increase the water supplies of most of the major cities if they are to be considered satisfactory. This will necessitate more materials, particularly pipe. It appears probable that as far as pipe is concerned, the increased supply must come from within Yugoslavia. Hence, immediate attention should be given to increasing the manufacturing facilities for both cast-iron and cement-asbestos pipe.

Bacteriological control of water supplies is ordinarily carried out by the various Hygiene Institutes. A presumptive test for the coliform group of bacteria is usually done, and based on multiple dilutions, a Most Probable Number of 20 per 1000 ml is permitted. In many cases there is not complete co-ordination between the laboratory personnel of the health agency and the management of the water system. In most localities each bacteriological sample is considered as a case unto itself and there is not readily available in one place information for a long period.

"Break-point" chlorination is not being used on any surface supplies. This chlorination technique should be investigated to determine whether it has any advantages for Yugoslavian water supplies. There would be definite advantages if the present "Orthotolidine" method of measuring chlorine residuals were replaced by the "orthotolidine-arsenite" method which allows the measurement of both "free" and "combined" chlorine residuals.

Recommendations:

(a) Every effort should be made to alleviate the causes of low or negative pressures on water lines in municipalities. In addition to developing new or augmenting existing sources of water supply, steps such as repairs of leaks in the mains and enforcement of water economy in households would also be helpful.

(b) In order to prevent wastage of critical material sound sanitary engineering advice should be obtained before new water supplies are built or before existing ones are materially altered.

(c) There should be close co-operation between health laboratories and the officials of waterworks. Results of analyses should be transmitted to waterworks officials promptly. A cumulative record of the results of bacteriological analyses should be maintained.

(d) The orthotolidine-arsenite method of residual chlorine determination preferably should be used.

(e) The possibility of the use of "break-point" chlorination techniques for surface water supplies should be investigated.

Sewerage, Waste Disposal and Stream Pollution

The subject of pollution of streams by industrial waste is assuming increasing significance in Yugoslavia which is in the process of great industrial development. Unfortunately, this country is repeating almost all the mistakes on water usage which were made by Western Europe and the United States during a similar period of industrialization. In most parts of the country the water resources are not over-abundant and too little attention is being given to protecting streams so that they may be used to the maximum for industry, as sources of potable water supplies and for recreation and agriculture. The assumption is being made in many cases that streams are able to absorb an almost unlimited amount of industrial waste or that treatment for the wastes can be installed at some future date. Already a number of streams are polluted by industrial waste and their usefulness for other industrial, municipal and recreational purposes has been seriously impaired. It is possible that one of the first limiting factors in Yugoslavia's industrial development in some areas will be a shortage of suitable water. As regards housing, it is definitely unsound to build new apartment blocks for workers and then to discharge the sewage on to the surface of the ground as is being done in some instances.

Recommendations:

(a) In order that water resources may be allocated properly, it is essential that they be studied thoroughly. It is none too early to initiate now on the principal streams a systematic study of the physical, chemical, biochemical and biological characteristics of the streams. Only thus can there be attained the necessary data on which intelligent allocation of water usage can be made. The results of these studies should be utilized for allocating the water resources to industrial, municipal, recreational and agricultural uses.

(b) When new town sites are planned, the early planning should include a study of the method of sewage treatment and disposal which is available. All new towns should be provided with adequate sewage treatment plants.

(c) In planning of new industries early attention should be given to the necessity for the adequate treatment of wastes. It is not always possible to treat industrial wastes so that they can be discharged satisfactorily into a small stream. The type of treatment necessary may be an important factor in selecting the factory site. As an example, lagooning of the wastes is sometimes the best method of treating the wastes from a factory, and therefore, the factory must be located where the terrain makes it possible to construct lagoons. The early planning should also consider whether it is more economical to treat such industrial wastes separately or in conjunction with the domestic sewage from nearby municipalities.

(d) If it is decided to initiate a regular stream pollution survey service, it will, of course, be necessary to provide both land and water transportation and to expand existing laboratories. The value of a stream pollution survey programme as a training ground for young sanitary engineers should not be overlooked.

Food and Milk Sanitation

Food and milk production is under the jurisdiction of the Hygienic Institutes of the various People's Republics and also under the subordinate Institutes of